

REMARKS

1. Status of the Application

Claims 1–11 were originally pending in the application. None of the claims were cancelled, and thus, claims 1-11 remain at issue in the current application.

Claims 1-11 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Applicants amended the claims to clarify the coating is cured when the extractables are measured. Applicants respectfully submit the amendments overcome the 112 rejection.

Concerning the silicone extractables defined in terms of micrograms per square centimeter, Applicants submit the extractables are listed as a percentage of the coat weight in several Examples given in the specification. For instance, in Example 2 on page 16, extractables are listed as 2.3% of coat weight, which is equivalent to 0.79 micrograms/square cm. Similarly, in Example 5 of the application, extractables were measured at 1% of coating, equivalent to 0.21 micrograms/square centimeter. When the silicone coat weight is known, the relationship between percent extractables (measured in %) and total silicone extractables (measured in units of micrograms of Silicone per square centimeter) is just a conversion of units. Expressing silicone extractables per unit area has become a standard for industries such as the microelectronics industry, as this gives a more accurate picture of the amount of siloxanes that would be available to transfer.

2. Rejection of the Claims in view of Leir et al.

Claims 1-11 stand rejected under 35 U.S.C. §102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 5,576,356 to Leir et al.. In order for a reference to act as a §102 bar to patentability, the reference must teach each and every element of the claimed invention. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 771 (Fed. Cir. 1983). Without the required teaching of “each and every element” as set forth in the claims, it is improper to maintain such rejections under §102(b). Leir et al. do not teach each and every element of the claimed invention, and thus fails as an anticipatory reference. Similarly, Applicants’ invention is also not obvious in view of Leir et al.

The present invention is directed to release liners. In the invention, a radiation curable silicone release agent is dispersed in an organic solvent and then applied onto the surface of a substrate. Dispersion of the silicone release agent in an organic solvent provides for smoother

surfaces, better uniform coating and better adhesion of the release agent. The coated substrate is exposed to conditions sufficient to remove the solvent, e.g., heating optionally in the presence of high velocity air. The substrate is then exposed to radiation to cure the silicone release agent.

Applicants' invention allows for the manufacture of a release liner having significantly reduced amounts of undesirable components, such as reduced total silicone extractables (measured as micrograms/square cm) and/or volatile silicone compounds (measured in ppm). Preferably, the release liners of the invention have no more than about 10 parts per million and more preferably less than about 2.0ppm of volatile silicone compounds in the cured product (see specification at p. 2).

Although not wishing to be bound by any explanation of the invention, it is currently believed that treating the coated substrate with heat and/or high velocity air not only drives off the solvent, but also provides molecular agitation of the compositions. As a result, volatile silicone compounds, which are present in such compositions, can be driven off as well, thereby reducing the amounts of such compounds in the cured product. Reduced amounts of total extractables and/or volatile silicone compounds in the cured release layer results in a product exhibiting minimal or substantially no silicone transfer to adjacent surfaces. In turn, such release liners of the present invention have better adhesive properties of adjacent adhesive layers, fewer printing problems on face stock, and minimal or no silicone migration in microelectronic applications. Leir et al. do not teach or suggest these aspects of Applicants' invention.

Applicants further emphasize that percent extractables do not tell the whole story on the advantages of Applicants' invention. In fact, significant improvements of Applicants' invention are shown in the outgassing test results given in Example 6. Comparison of Applicants' invention to that of a "conventional" release liner prepared without solvent and without a heating step are provided, wherein "[s]amples of release liners of the invention and conventional UV cured silicone based release liners were analyzed for volatiles content by outgassing as described above." The release liner of Leir et al. is a "conventional UV cured silicone based release liner," "prepared without solvent and cured without a heating step" similar to Sample E of Applicants' invention. From a simple comparison of the results, it is clear that Applicants' invention, Samples C and D, have a much lower level (in fact one-tenth of the amount) of siloxanes, or outgassing components (57 nanograms/square centimeter and 32 nanograms/square centimeter, respectively), than the "conventional UV curable release liner prepared without solvent and cured without a heating step," having a much higher siloxane reading of 474 nanograms/square centimeter.

Leir et al. describe a radiation cured silicone release coating from solutions of relatively low levels of a polyorganosiloxane substituted with small amounts of reactive functional groups dissolved in a co-reactive monomer or mixture of monomers and containing a photoactive catalyst (col. 4, lines 25-29). Leir et al. state “a need exists for rapidly curing silicone coating which can be rapidly and completely **cured in air**” (emphasis added) (col. 4, lines 4-5). Also in column 9, lines 43 to 45, Leir et al. teach that drying air should be “less than the boiling point of the constituents thereof”. Many of the components in Leir et al. are monomeric in nature and would boil at relatively low temperatures. The desire and design is for those components to remain in the coating as they are functional and should react into the polymer matrix. However chemical reactions are always incomplete, and any of the monomers left unreacted would be undesired volatiles. Statements are made in the Office Action that Leir et al., referring to Example 35, column 17, disclose the same silicone composition and curing temperature disclosed by Applicants. However, the epoxysilicone composition of Example 35 is prepared as described in Example 33. Example 33 states “[t]his example describes how two *solventless* epoxysilicone containing compositions were used to make near premium release and modified release silicone coatings . . .” [emphasis added] Col. 13, lines 65-67. Thus, neither the process nor the resulting the composition of Leir et al. are the same as Applicants’ process and resulting release liner.

Furthermore, as stated in the Office Action, “[p]atentees fail to teach the total silicone extractable content.” (Office Action, p. 4). Specifically, Leir et al. do not mention any measurement of extractables or volatiles in its disclosure, both of which are specifically claimed by Applicants. As noted above, Applicants’ process is different from that of Leir et al., which results in a different product – one with significantly low levels of extractables and volatiles. There is no teaching or suggestion of the importance of these characteristics in the product of Leir et al., as discussed and claimed in Applicants’ invention. Thus, the rejection of Claims 1-3 and 5-11 as being anticipated, or alternatively, obvious in view of Leir et al., fails.

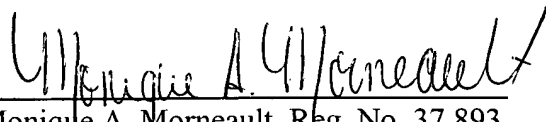
Conclusion

In view of the arguments presented above, Applicants respectfully submit that Claims 1-11 are now in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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